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HYDROPHOBIA

IN RELATION TO

M. PASTEUR'S METHOD

AND THE

REPORT OF THE ENGLISH COMMITTEE.

A LECTURE DELIVERED IN PRINCE'S HALL, PICCADILLY,
JULY 27TH, 1887,

BY

DR. A. LUTAUD,

Editor-in-Chief of the "Journal de Médecine de Paris."

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HYDROPHOBIA

IN RELATION TO M. PASTEUR'S METHOD

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REPORT OF THE ENGLISH COMMITTEE.

It is not without a deep sense of my responsibility on this occasion that I have resolved to entertain an English audience with facts that were, until of late, restricted to France.

The appointment in April of last year of an English Committee to inquire into the efficacy of M. Pasteur's system of preventing hydrophobia, by means of inoculation, has brought the question before public opinion in this country.

The extraordinary conclusions which this Commission has come to—in no way justified, either by past experience or present experiments, as we intend to prove clearly—has forced, so to say, upon me the duty to protest here, as I have done, and was the first to do, in France.

I have the conviction that, in acting as I do, I am serving the scientific interests of my country.

What I mean to lay before you to-night are arguments that will, certainly, before very long, be in everyone's mind.

It is impossible to read the Commission's Report without being struck by its inconsistent and confused character.

What people here will say, allow a Frenchman to say first, and proclaim that, if M. Pasteur has found systematic supporters in France, good sense is still strong enough, in my country, to do justice upon this fallacious and absurd enthusiasm.

I suppose you are, most of you, perfectly acquainted with the characteristic features of the new treatment proposed by M. Pasteur.

It consists, as you know, in making inoculations with the spinal marrow of rabbits which have died from rabies, upon persons supposed to have contracted hydrophobia from the bite of suspected rabid animals. The principle consists in injecting a new dose of poison into the circulation of a person already infected by a similar virus.

Theoretically, it seems irrational to pretend to cure a disease due to a poison by augmenting the proportion of the same poisonous substance. But we must come to more important considerations and examine particularly the results of the method, the only criterion which will enable us to form a reliable judgment on the subject.

JENNER AND PASTEUR.

Firstly, allow me to make some remarks on the official Report, and to point out to you the numerous statements liable to contradiction.

After paying to M. Pasteur an eulogistic tribute, the report sets up a most hazardous parallel between the new method of inoculation and the Jennerian vaccination.

The reporter writes :—“ It may be deemed certain, that M. Pasteur has discovered a method of protection from rabies, comparable with that which vaccination affords against infection from small-pox.”

I really cannot understand how the learned members of the Commission could have assented to such an erroneous assimilation.

Jenner professed to mitigate the severity of small-pox by producing a mild disease ; but Pasteur inoculates no disease at all, and his early treatment caused neither eruption nor any morbid symptom whatever.

For everyone, the object of Jenner's treatment is to prevent infection in healthy persons ; Pasteur's pretends to be a curative treatment, for persons already suffering from an infectious virus.

In the first case, it is a prophylactic treatment; in the second case, it is a curative treatment.

THE EXPERIMENTS OF THE REPORT.

But, further, so far as can be inferred from the facts quoted in the Report, the conclusions arrived at do not appear warranted. The process of induction followed involves several fallacies. For instance, the test experiments of Professor Horsley, designed to clear up disputed points, seem to have only introduced fresh elements of confusion. The experiments were performed on dogs and rabbits, which he injected with emulsions, of various degrees of intensity, prepared from the spinal cords of rabbits which had died from rabies, and then suffered the victims to be bitten by mad dogs or cats. Some of those bitten, who had been protected by these "injections," did not die from rabies—but one, at least, did; while of the "unprotected" animals, bitten at the same time, all did not die. The results were, consequently, doubtful and indefinite.

Have the reporters been more accurate in their investigations in Paris? How did they proceed? They asked M. Pasteur to enable them to inquire personally into the cases of some of those who had been treated by him. Accordingly, the names of 90 persons were taken from his note-books.

The Report says (page iv.), "Among the 90 cases, there were 24 in which the patients were bitten . . . by undoubtedly rabid dogs."

They admit, as you see, that the others had no reason to believe they were bitten by rabid animals; then why say, a few lines lower down, that 8 persons, at least, among the 90 should have died of rabies? The rate of mortality acknowledged by the Commissioners being 5 per cent., we ought to have only $1\frac{1}{4}$ death for 24 cases.

But how do they come to this number—24? What proof have they that even 24 persons were bitten by "*undoubtedly rabid*"

animals? According to M. Pasteur, the only method of recognising with certainty hydrophobia in an animal is to produce the disease by inoculating another animal with its spinal cord.

In *one case* only (No. 56 in the Appendix of the Report) this proof was obtained.

The personal inquiries affixed in the Appendix are simply disappointing. In 14 cases only *post mortem* examination was made, by a veterinary surgeon, and 4 dogs only, out of the whole number, were kept until death. Now we know that there is no certain symptom, belonging to hydrophobia, recognizable by autopsy. But death brought on by this malady being, on the contrary, easy to diagnose, we see that the Commission, on the whole, has only presented 5 cases of dogs certainly rabid, and not 24; these are—one inoculated case and the four I have just mentioned.

STATISTICS ON RABIES.

Now, how do the Committee proceed in estimating M. Pasteur's statistics?

They begin by admitting that* "*After the first few months, in which M. Pasteur practised his treatment, he was occasionally obliged, IN ORDER TO QUIET FEARS, to inoculate persons who believed that they had been bitten by rabid animals, but could give no evidence of it.*"

Then the report says:—

"Between October, 1885, and the end of December, 1886, M. Pasteur inoculated 2,682 persons. Of the whole number, at the rate of 5 per cent., at least 130 should have died."

Accepting as a fact that the mortality on patients bitten by *rabid* animals is 5 per cent., we must deduct from the enormous number of 2,682, the persons who were treated "*in order to quiet fears.*"

* Here we copy the text.

It cannot be sustained, even by the credulous Commissioners, that all the persons inoculated at the *Ecole normale* had been bitten by rabid animals. The ridiculous boast of the Pasteurians that all the persons inoculated were in danger of death from hydrophobia, should be itself sufficient to condemn the system.

I made frequent visits to M. Pasteur's institute, when the hydrophobic craze was most intense. I interrogated numbers of people attending, and they were not able to produce to me the slightest proof that the animals they had been bitten by were rabid. They said that the dog had been immediately killed, or that the animal was only suspected. Most of them were slightly bitten through their clothes; some had only their dresses touched by the suspected dog; but, such was then the fear of rabies, that they ran to M. Pasteur, and were accepted as hydrophobic in order to enlarge the list of cures.

But M. Pasteur himself, overcrowded by the considerable number of patients, and feeling the absurdity of his situation, was obliged to establish categories among his customers. According to the statements published by the Anti-Rabic Laboratory, and accepted by the Commissioners, only 233 persons amongst the 2,682 were bitten by animals proved to be rabid.

The proportion of 5 per cent. is then to be taken not from the amplified sum of 2,682 patients but from the real number of 233, accepted by M. Pasteur himself.

We have then to correct the report of the Committee, which says: "Taking as the lowest rate of mortality from the bite of rabid animals 5 per cent., the total number of inoculated persons being 2,682, at least 130 should have died."

Instead of which we must say, "The lowest rate of mortality being 5 per cent., the total number of persons bitten by rabid animals (according to M. Pasteur himself and the Commissioners) being 233, only 15 should have died.

We must see, now, how many persons have died after M. Pasteur's treatment during the period quoted by the Committee, between October, 1885, and December, 1886.

According to our tables, the total number of deaths during the quoted period has been 43. M. Pasteur and his Commissioners say only 40. Making fair allowance for uncertainties, and for questions which cannot be easily settled, we accept this number of 40.

Where is then the benefit of the new treatment? Instead of 15 deaths, which is the usual average, we have 40! Twenty-five more than if no treatment at all had been given!

RABIES IN FRANCE.

But the uselessness and even the danger of M. Pasteur's treatment is demonstrated, by a careful examination of the cases of rabies observed, in France, during the year 1886.

The best manner of judging the value of the new treatment is to compare the rate of mortality from rabies *before* M. Pasteur's new discovery, and *after* its application to human beings.

If the statistics show that the mortality from rabies is reduced to *zero* by the new treatment, we must recognise the value of the discovery; if the mortality remains the same, or is increasing, we must suspect the invention of being useless or dangerous.

Let us now see what, during a period of thirteen years, previous to 1863, M. *Tardieu*, the eminent professor of forensic medicine in Paris, has found to be the official return of the rate of mortality from rabies in France. According to this author it amounted to 25 cases. Dr. Tardieu adds that this number, which was obtained through the French authorities of all the departments, and consequently perfectly correct, ought to be made widely known, in order to neutralise the effects of the panic, created by the current idea in the public that the cases are extremely frequent and cause a very great number of deaths. Professor Brouardel, who now holds Tardieu's chair as the Paris Faculty, gives, as the annual mortality for France, a total number of 30 cases.

These figures are very interesting, and prove that rabies is, in France, very rare in the human race. The statistics furnished

by the different countries are equally demonstrative. In England and Wales, the annual average of deaths from rabies is 43. In Austria, the annual death rate has amounted to *twelve* cases only. In Prussia, where muzzling has been strictly enforced, the figures for the last five years have been : ten, six, four, one, and, finally, *zero*.

In fact the statistics of the different nations are much alike and prove that the disease is extremely rare.

We have said that, for France, the annual average of deaths from rabies has, for the last twenty years, amounted to 30. Let us see now how many deaths took place in that country during the year 1886, when the method was in its full development.

The table of deaths, which I present to you, shows for France a total of 25 deaths from hydrophobia after the celebrated treatment.

If we add to that number 17 deaths from rabies, among people who did not undergo M. Pasteur's treatment, we obtain for the whole of the year a total number of 42 deaths. The annual rate being 30, we find that, for the year 1886, during which inoculations have been practised, 12 deaths took place in excess of the preceding years.

We might then ask M. Pasteur and the British Commissioners :—

Has the death-rate from hydrophobia been lowered in France during the year 1886 by Pasteur's method ? Answer : *No*.

Does the death rate tend to rise on account of the treatment ? Answer : *Yes*.

Now, if you observe the table of deaths,* we remark that, of the 25 persons treated by M. Pasteur, during the last months of the year 1886, nine died with the symptoms of paralytic rabies, which is the usual form of hydrophobia in rabbits.

If we consider that the increase of death was coincident with the application of the new treatment, called the *intensive method*, we arrive at the conclusion that, not only has M. Pasteur not been curing rabies during the year 1886, but that there is the most

* See Appendix of the Report.

serious reason for believing that he has exposed, by his practice, the lives of some of the confiding patients who trusted themselves to his hands.

THE DIFFERENT METHODS.

We are now going to see why M. Pasteur has modified his first system, and the different changes which have taken place in the method, since its first application in October, 1885.

One of the weak points of the Official Report is that the Commissioners support their conclusions, concerning the ninety cases quoted, on observations taken when M. Pasteur was applying a method which is not now used. As is well known, the celebrated chemist has three times modified his treatment. At first, he used a virus which seemed harmless; the patients were then dying from the rabies contracted by the bites of animals just as if they had not sustained any treatment at all.

THE INTENSIVE METHOD.

In presence of the non-success of his earlier system, M. Pasteur boldly applied what he called the *intensive method*. The unfortunates, who were confident enough to place themselves in his hands, died from the treatment itself, with the experimental form of the disease, just as we notice it on the rabbit, and as it was illustrated by Goffi's case. Again, later, frightened by the numerous deaths, he modified his treatment to return to a sort of mixed system of inoculations, which is either dangerous or inefficacious.

We have now to give our opinion on the famous intensive method which has caused the death of a certain number of human beings, and amongst them, of two English subjects—Goffi and Wilde.

THE DEATH OF GOFFI.

What says the Report about Goffi?

“ On the 4th of last September he was severely bitten at the Brown Institution by a cat. The wounds were immediately freely

cauterised, and six hours later the wounded portions of skin were excised at St. Thomas's Hospital. He was sent to Paris the same night, and, on the following morning, M. Pasteur commenced the intensive treatment, and it was continued 24 days.

"On the 10th October he returned to his work, and appeared to be in his usual health; but he became unwell with pains in the abdomen, like colic, and with pains in the back. On the 18th, he had partial motor paralysis in the lower limbs (which are the symptoms observed in rabbits killed by experiment, but hitherto unknown to man); he grew worse and died on the 20th, completely paralyzed.

"To the last (adds the Report) he was free from all the usual symptoms of hydrophobia, and the progress of his disease and the manner of his death were similar to those of acute paralysis. But the certainty that his death was due to the virus of rabies was proved by experiments made by Mr. Horsley. A portion of his spinal cord was taken to provide material for inoculations, and rabbits and a dog inoculated with it died with characteristic signs of paralytic rabies, SUCH AS USUALLY OCCURS IN RABBITS.

"In most of the other cases of death, after treatment by the intensive method, the symptoms have been nearly the same as those just related."

This case amply justifies the writer of the report when he says a few lines above those just mentioned:

"But, after the intensive method, deaths have occurred under conditions which have suggested that they were due to the inoculations rather than to the infection from the rabid animal."

It is added, further, as an excuse for the non-success, that Goffi was subject to intemperate habits.

THE INFLUENCE OF ALCOHOLISM.

M. Pasteur and the British Commissioners try to explain the death of the victims by drunkenness. It is said, for instance, that, during his treatment in Paris, Goffi was "*repeatedly intoxicated.*" They conclude, then, that the risk of death from hydrophobia is

increased by habits of intoxication, and that most of the patients treated by M. Pasteur would have been cured if they had not been under the influence of alcoholism. But, if we look at the tables of deaths, we see that a number of the victims were children under twelve years of age. Could we really suppose that the poor children were drunkards?

It might be easily demonstrated that Goffi never for an instant had hydrophobia from the bite of the animal. The accident took place at the Brown Institution, and at the very moment the most active caustic—carbolic acid—was applied on his wounds. This was more than sufficient to neutralize the action of any virus or poison. Moreover, the bitten man was taken, at once, to St. Thomas's Hospital, and operated upon in such a manner as to render absolutely impossible the effects of the poison. There is not the slightest doubt that, if Goffi had remained quietly in England, instead of running to Paris, he would be to-day performing his duties at the Brown Institution.

THE DEATH OF WILDE.

The same argumentation can be presented for Wilde, of Rotherham, who died with the same symptoms. The supporters of M. Pasteur pretended that Wilde died of pneumonia; but the symptoms did not correspond to this. The report of the case and of the *post-mortem* examination, published in the Rotherham papers, showed a great resemblance to the paralytic symptoms manifested by Goffi and the numerous victims of M. Pasteur's treatment in France.

It must be said that pneumonia is one of the most important symptoms of the paralytic form of hydrophobia. The pneumonia is due to the paralysis of the bulba, the extremity of the spinal cord. The paralysis of the lungs has been noticed in all cases of paralytic rabies, in man and in animals. Accordingly Dr. Clarke was perfectly justified in saying: "It is almost impossible to avoid coming to the conclusion that the nineteen inoculations with the

spiral marrow of the diseased rabbits were the cause of death of this unfortunate young man."

I have quoted those two cases as being more interesting to the English public; but, unfortunately for us, M. Pasteur has been applying his intensive method on a large scale to the French patients; and the results have been the same, if not worse.

THE RESULTS OF THE INTENSIVE METHOD.

During the last three months of the year 1886 the intensive method was applied in its most active form. The results were as follows :—

Nine individuals, most probably not affected with hydrophobia, but submitted to this dangerous treatment, died from the paralytic rabies inoculated from the rabbit.

The following observation made by Professor Germe, of Arras, and communicated to the Academy of Medicine, of Paris, by Professor Peter, may be considered as typical of the nine cases of paralytic hydrophobia noted in December and January.

A man, named Née, aged 42, a basket-maker, was travelling in the country with a little cart, under which was a dog, on November 12th, 1886, near Avesnes-le-Comte; he let his dog loose, and was immediately bitten on the right leg. He seized the dog, tied him up, and killed him. The dog had never ceased taking food. The *post-mortem* examination of the dog was made at Arras, by a veterinary surgeon, who stated that he could find no symptoms proving that the dog was rabid. Née remained eleven days at M. Pasteur's institute, during which, he received twenty-two inoculations. After each inoculation, he complained of giddiness, felt sick, and vomited. On his return to Arras, on November 29th, nothing remarkable was observed, except increase of appetite, which had also been the case while staying at Paris. During the nights of December 10th and 11th, intense pain was felt in the parts of the body pricked by the inoculations; the pains rapidly invading the spine, and continuing until the last moment. The patient was

restless, and said that he was suffering from the inoculations in Paris, and was sure he would die. A physician, who was called in, supposed first that Née was suffering from lumbago, and, later on, from inflammation of the spine. The above symptoms were followed by great difficulty in breathing, salivation, and convulsions of the muscles of the face; the patient had nightmares, was restless, and sweated profusely; but there were no general convulsions or hydrophobia. He could swallow easily, except on the last two days of his life. On the 14th, two physicians were called in consultation, and they were in doubt as to whether it was inflammation of the spine or the result of the inoculations. Paralysis set in soon after; the sight grew weaker and weaker, till it was completely lost; breathing became more and more difficult, and saliva issued abundantly from the sides of the mouth. At last the patient died, on December 17th.

Although the usual symptoms of hydrophobia were absent, I am of opinion that Née's death was due to hydrophobia. Considering that the pain was not felt in the parts bitten, nor along the nerves of the leg, but on the points of inoculations; also along the nerves placed between these points and the spine—pains of which the patient never ceased to complain, from the first day to the last—it may be allowed to say, that the unfortunate man died of *rabbit derived* hydrophobia.

The other cases of paralytic hydrophobia being very similar to the above case, it would be useless to enter into more details.

M. PASTEUR'S NEW DISEASE.

In fact, it is now certain, that if M. Pasteur does not cure hydrophobia, he can give it. The great chemist has been creating a new variety of disease, which I have called *the experimental rabies*. In that horrible malady, the pains are felt, not in the points bitten by the suspected animal, but in the points inoculated by the syringe of the experimenter; and the patients die, not as in cases of ordinary hydrophobia, but as the tortured rabbits die, under M. Pasteur's hands.

This opinion, which I was the first to express, has been since confirmed by the most eminent physiologists and physicians. Professors Peter and Colin, of Paris; Doctor Clarke, of London; Professors Billroth and Von Frisch, of Vienna; Professor Michelacci, of Florence; Professors De Renzi and Amoroso, of Naples; Professor Ahren, of Lisbon have condemned the intensive method as the most dangerous and murderous practice introduced until now into human medicine.

THE VALUE OF THE METHOD DEMONSTRATED BY EXPERIMENTS.

As we have already stated, the experiments made by Mr. Horsley, at the Brown Institution, in order to test M. Pasteur's method of curing rabies, are not conclusive.

The first remark to be made is, that the experiments are very few.

We do not speak of the inoculations made on English rabbits with the spinal cords of the rabid animals sent from Paris by M. Pasteur. The four rabbits so inoculated died the seventh day of the inoculation, as is usually the case. There is no doubt that rabies can be transmitted to rabbits, by injecting, under the *dura-mater*, the diluted spinal cord of rabid animals. The same may be said for the 4 dogs, inoculated in the same manner, which died 14 or 16 days after the inoculations.

The important question was, to ascertain if an animal, *inoculated* by the spinal virus of the rabid animal, could be protected by the subsequent injections according to M. Pasteur's theories. This the Commission did not do.

Mr. Horsley's experiments were made on dogs previously protected by injecting the emulsions of spinal cord of different strengths, and then *bitten* by rabid dogs and cats. If they proved anything, it was that M. Pasteur can produce a state refractory to rabies; but they do not even prove that.

Firstly, on the *six* dogs so treated, ONE DIED. It is said that he died from eczema, but such an explanation amounts only to an excuse, and it is difficult to admit that an eczema would have produced death at the very same period at which the animal ought to have died from rabies.

Secondly, the six dogs were bitten, instead of being inoculated. Everyone knows that there is nothing more uncertain than the inoculation from bites. The risk from the bite of a rabid animal is, says Dr. Bell Taylor, much less than one would suppose. Indeed, if there is a poison, how is it to get into the wound ? and how does it get into the system ? The dog has no apparatus for injecting, as the viper has ; the virus has, any way, but small chance of penetrating into the circulation.

There is not, then, the absolute evidence required, in order to prove that the animals bitten were really inoculated by rabid virus.

The experiments that Mr. Horsley ought to have done, to give the most complete evidence of the value of M. Pasteur's treatment, were performed by foreign experimenters : in Austria, by Von Frisch ; in Naples, by Amoroso and de Renzi ; and in Portugal, by Ahren.

The results obtained were in absolute contradiction with M. Pasteur's assertions.

PROFESSOR VON FRISCH'S EXPERIMENTS.

Professor Von Frisch, of Vienna, began as an admirer of M. Pasteur, and, in testing his results, hoped to confirm them.

In passing from animals to man, in his experiments, M. Pasteur makes one grave omission. In his human subject he performed his inoculations *after* the bite. In his animals, which he claimed to have rendered refractory to rabies, he always inoculated *before* the bite. Von Frisch has supplied this omission ; and he finds that, when inoculated by M. Pasteur's method, after having been infected with rabic matter, the inoculations would neither prevent nor retard the onset of the disease.

Von Frisch's experiments were confirmed lately, in England, by Mr. Dowdeswell. In a communication made to the *Royal Society*, in June last, this gentleman, a practical physiologist, says :—

“The method of protection against rabies, as practised by M. Pasteur, is unsuccessful with the rabbit; and the *intensive method* of inoculation is liable itself to produce infection.”

CONCLUSIONS OF THE ENGLISH REPORT.

M. Pasteur's fanatical supporters, in France and elsewhere, have been making a great noise about what they call the favourable Report of the British Committee.

But can we consider, as an approbation of M. Pasteur's practices, the following lines taken from the Report (page vii.) :—

“In most of the cases of death, after treatment by the intensive method, the likeness of the symptoms to those of the form of paralytic rabies usually observed in rabbits has suggested that the deaths were due, not to the virus of the dog or cat, but to that injected from the spinal cord of the rabbit;” and, further, “The question is likely to remain undecided;” but to avoid the possible risk of his intensive treatment, M. Pasteur has greatly modified it, and, even in the modified form, employs it only in the most urgent cases.

In fact, Pasteur's followers themselves, confess that the intensive method can *possibly* cause accidents. And what are those accidents? Simply death from rabies, by inoculation. How do they dare to apply this intensive method to man? And, if accidents are improbable, why did they themselves discontinue the intensive method?

There are no means of escaping the following dilemma. Either the method is proved to be inoffensive, and by the same cause useless; or the method is effective, which means dangerous.

M. Pasteur's supporters boast of being approved by Mr. Horsley; but they do not mention the unfavourable accounts of

the Brussels Anti-Rabic Institute, nor the negative conclusions to which Professor A. Michelacci has come to in Florence.

Allow me to state them ; they are most conclusive :—

“ Considering that it is impossible, actually, to regard as being demonstrated the *certain efficacy* and the *absence of all danger* of this method (M. Pasteur’s), the Provincial Council of Florence makes no suggestion for the formation of an institute for the treatment of hydrophobia in Florence.”

But the best proof that the British Commissioners have no faith in M. Pasteur’s treatment, and consider it as dangerous, is that, instead of proposing the formation in England of a hydrophobic institute, they plainly propose the enforcement of police regulations.

After exalting M. Pasteur’s valueless discovery, they propose :—

1. Keeping useless dogs should be discouraged by taxation.
2. Importation of rabid dogs ought to be prohibited.
3. Muzzling ought to be compulsory in districts where rabies is prevalent.

We must be grateful, indeed, to the Commission for their conclusions, which are at least based, not on the famous experiments of Mr. Horsley, but on common sense. We must thank the Commissioners for not having proposed the formation in England of a Pasteur Institute in which the application of the intensive treatment would have increased the mortality from rabies as has been the case in France.

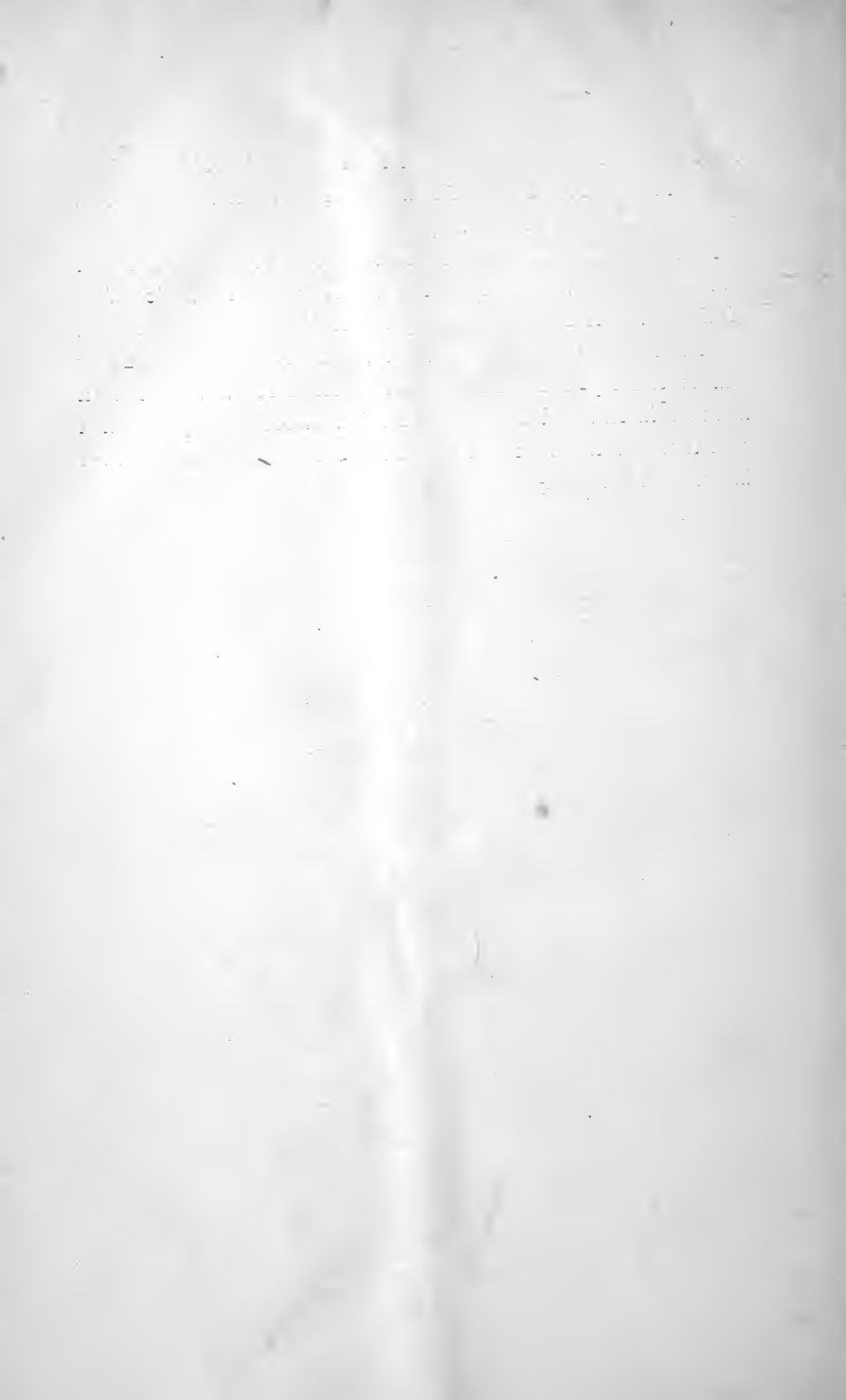
If we sum up what has taken place during the first year of the application of M. Pasteur’s method of preventing hydrophobia, we find that there has been an enormous increase in the number of persons who believe they have been bitten by mad animals, and a decided increase in the number of deaths from hydrophobia.

In France, in England, and in Spain, where M. Pasteur’s theories have been most warmly received, the increase of fear of death has been most marked.

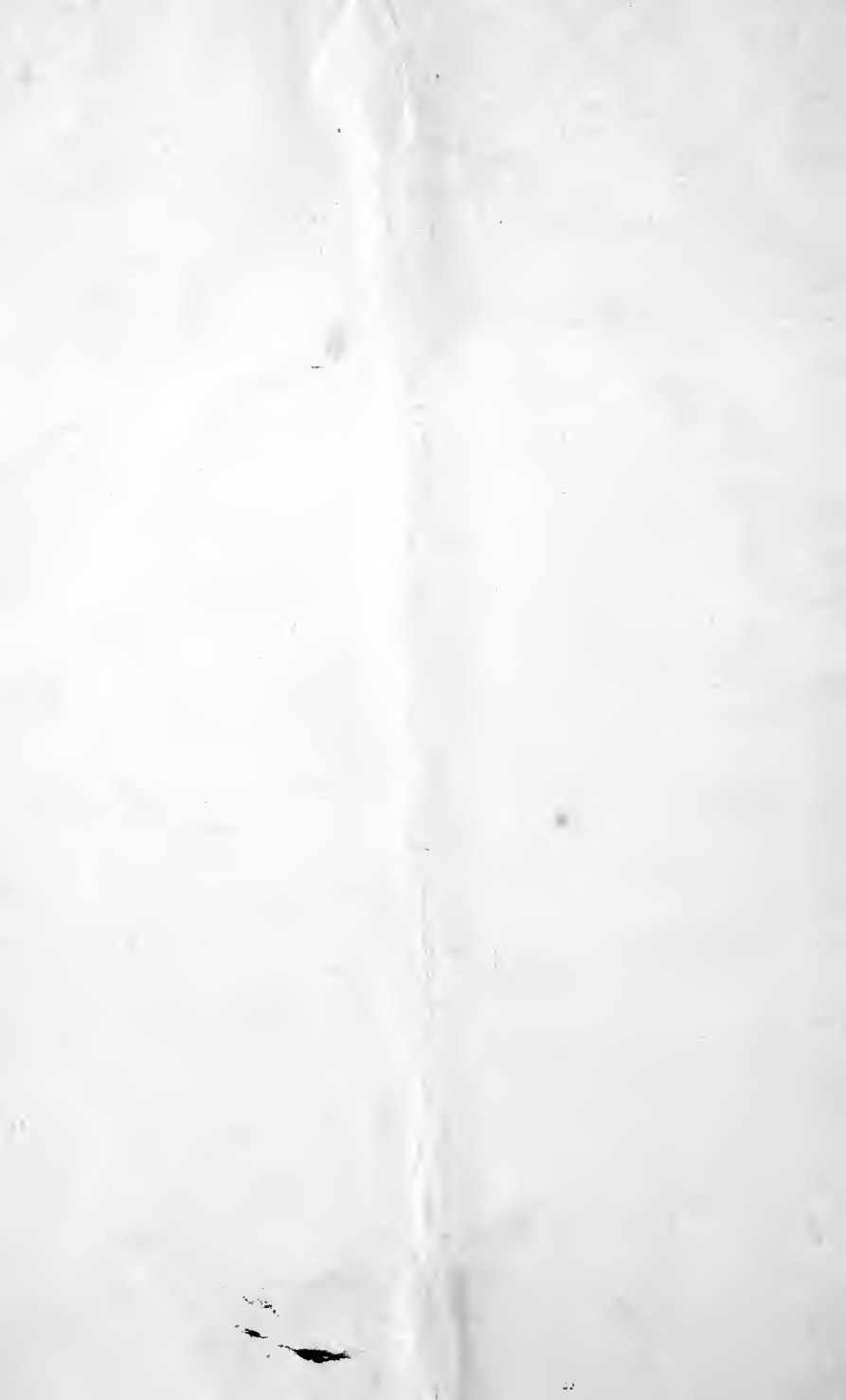
In Germany, where there is a sort of prejudice against all French ideas, the new teaching in regard to rabies has not taken root, and

there has been a complete freedom from the panic and folly which were exhibited in the countries I have named ; and hydrophobia is almost unknown in Germany.

I therefore now repeat, in concluding in all soberness, and with a full appreciation of the responsibility of such an assertion, that M. Pasteur's method of treating hydrophobia appears to be founded upon untrustworthy experiments and unsound reasoning. And I now add to this my conviction that its practical result has been an increase in fear and death ; and I think more strongly now than ever that this method ought to be rejected and condemned in the interests of humanity and of science.









(Nov., 1887, 20,000)

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